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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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| (21) International Application Number: PCT/US84/01977 (22) International Filing Date: 30 November 1984 (30.11.84) (31) Priority Application Number: 560,726 (32) Priority Date: 12 December 1983 (12.12.83) (33) Priority Country: US (71)(72) Applicant and Inventor: KASZYNSKI, Edwin, G. [US/US]; 12928 Dean Road, Wheaton, MD 20902 (US). (72) Inventors: BREUER, Miklos, M. ; 108 Ridge Avenue, Newton, MA 02159 (US). SHANDER, Douglas ; 5 Meadowgrass Court, Gaithersburg, MD 20878 (US). USDIN, Vera, R. ; 6 Stevens Court, Rockville, MD 20850 (US). VAN DER LEE, Hermes ; 13129 Hol- drige Road, Silver Spring, MD 20906 (US). | (74) Agents: HANDELMAN, Joseph, H. et al.; Ladas & Parry, 26 West 61 Street, New York, NY 10023 (US). (81) Designated States: AU, CH (European patent), DE (European patent), DK, FR (European patent), GB (European patent), JP, NL (European patent), NO, SE (European patent). Published <i>With international search report.</i> | |

(54) Title: HAIR GROWTH MODIFICATION

(57) Abstract

The rate and character of androgen-stimulated beard hair growth in intact, sexually mature male is altered by the topical application out of a dermatologically acceptable carrier of an antiandrogen material. In a preferred practice of the invention, compositions containing both a steroid 5-alpha-reductase inhibitor and a cytoplasmic androgen receptor-binding agent are employed.

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C L A I M S

1. A topical composition for altering the rate and character of androgen-stimulated hair growth, which comprises at least one antiandrogen agent consisting of a 5-alpha-reductase inhibitor or a cytoplasmic androgen receptor-binding agent or a mixture thereof, and a dermatologically acceptable carrier, the formulation of said carrier and the concentration of said antiandrogen agent being selected to effectively alter the rate and character of androgen-stimulated beard hair growth in intact, sexually mature males upon application to the skin and to provide a local effect with minimal alteration of other androgen-mediated bodily functions through systemic action.
2. A composition as described in claim 1, in which the 5-alpha-reductase inhibitor is progesterone; (5 α ,20-R)-4-diazo-21-hydroxy-20-methyl pregnan-3-one; (4R)-5-10-seco-19-Norpregna-4,5-diene-3,10,20 trione; 4-androstene-3-one-17 β -carboxylic acid, or its methyl ester; 17- β -N,N-diethylcarbamoyl-9-methyl-4-aza-5 α -androstane3-one; 11- α -OH-progesterone; 17- α -OH-progesterone; or 20- α -OH-progesterone.
3. A composition as described in claim 2, wherein the concentration of said antiandrogen agent is selected to result in the application of from about 10 to about 10,000 micrograms of 5-alpha-reductase inhibitor per square centimeter of skin.
4. A composition as described in claim 2, wherein the concentration of said antiandrogen agent is selected to result in the application of from about 100 to about 1,000 micrograms of 5-alpha-reductase inhibitor per square centimeter of skin.
5. A composition as described in claim 1, in which the cytoplasmic androgen receptor-binding agent is cyproterone acetate, chlormadinone acetate, 17-alpha-propyltestosterone; 17-alpha-allyltestosterone; α - α - α -trifluoro-2-methyl-4'-nitro-m-propionotolidide; 6 α -bromo-17 β -hydroxy-17 α -methyl-4-oxa-5 α -androstane-3-one; 17 β -acetoxy-4 α ,5cyclo-A-homo-B-nor-5 α -androst-1-ene-3-one; or spironolactone.



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6. A composition as described in claim 5, wherein the concentration of said antiandrogen agent is selected to result in the application of from about 0.1 to about 5,000 micrograms of the cytoplasmic androgen receptor-binding agent per square centimeter of skin.

7. A composition as described in claim 5, wherein the concentration of said antiandrogen agent is selected to result in the application of from about 1.0 to 500 micrograms of cytoplasmic androgen receptor-binding agent per square centimeter of skin.

8. A composition as described in any one of the preceding claims, in which a 5-alpha-reductase inhibitor is used along with a cytoplasmic androgen receptor-binding agent.

9. A topical composition for altering the rate and character of androgen-stimulated hair growth, comprising a 5-alpha-reductase inhibitor consisting of progesterone or 4-androstene-3-one-17 β -carboxylic acid and a cytoplasmic androgen receptor-binding agent consisting of 17-alpha-propyltestosterone or 17-alpha-allyltestosterone, said 5-alpha-reductase inhibitor and said cytoplasmic androgen receptor-binding agent being formulated in a dermatologically acceptable carrier, the concentrations of said 5-alpha-reductase inhibitor and said cytoplasmic androgen receptor-binding agent each being from about 0.1% to about 10.0% by weight of the composition.

10. A composition as described in claim 9, in which the concentration of said 5-alpha-reductase inhibitor is from about 0.5 to about 5.0% by weight of the composition and in which the concentration of said cytoplasmic androgen receptor-binding agent is from about 0.02 to about 0.5% by weight of the composition.

11. A process for altering the rate and character of androgen-stimulated beard hair growth in intact, sexually mature males, which comprises applying to the skin a composition according to any one of the preceding claims.

12. The use of a composition according to any one of the preceding claims 1 to 10, to alter the rate and character

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of androgen-stimulated beard hair growth in intact, sexually mature males.

SUBSTITUTE SHEET



INTERNATIONAL SEARCH REPORT

International Application No.

PCT/US 84/01977

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all): According to International Patent Classification (IPC) or to both National Classification and IPC

A61K 31/56

424/240

II. FIELDS SEARCHED:

Minimum Documentation Searched

| Classification System | Classification Symbols |
|-----------------------|------------------------|
| U.S. | 424/240 |

Documentation Searched other than Minimum Documentation
to the Extent that such Documents are Included in the Fields Searched

- (1) CAS-On line computerize Search
- (2) Mead-Lexis computerize Search

III. DOCUMENTS CONSIDERED TO BE RELEVANT¹⁴

| Category ¹⁵ | Citation of Document, ¹⁶ with indication, where appropriate, of the relevant passages ¹⁷ | Relevant to Claim No. ¹⁸ |
|------------------------|--|-------------------------------------|
| X | US,A4,098,802 published July 4, 1978 by van der Vies | 1-10 |
| X | US,A4,310,523 published Jan. 12, 1982 by Friedmund Neumann | 1-10 |
| X | US,A4,039,669 published Aug. 2, 1977 by Beyler et al | 1-10 |
| Y | US,A4,269,831 published May 26, 1981 by Ferrari et al. | 1-13 |
| P,Y | US,A4,439,432 published Mar. 27, 1984 by pest | 1-13 |

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

IV. CERTIFICATION

Date of the Actual Completion of the International Search¹⁹

9/12/85

Date of Mailing of this International Search Report²⁰

26 FEB 1985

International Searching Authority²¹

ISA/US

Signature of Authorized Officer²²

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